Electron-rotation coupling in diatomics by intense UV pulses

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The electronic angular momentum projected onto the diatomic axis, naturally couples with the angular momentum of the nuclei rotations. Such an electron-rotation coupling is safely neglected in weak-field regime, and rightly not included in the conventional model for pulse-molecule interactions. Our recent theoretical investigations [1-5] improved the conventional pulse-molecule interaction model by including the electron-rotation coupling in the Hamiltonian, and revealed that such a coupling significantly affects the rotational motion of the system under electronic excitations by intense lasers. The importance of the electron-rotation coupling effect is presented through collecting the photodissociation dynamics as kinetic energy release spectra and angular distribution of photofragment. These theoretical results advance our in-depth understanding of intense pulse molecule interactions.

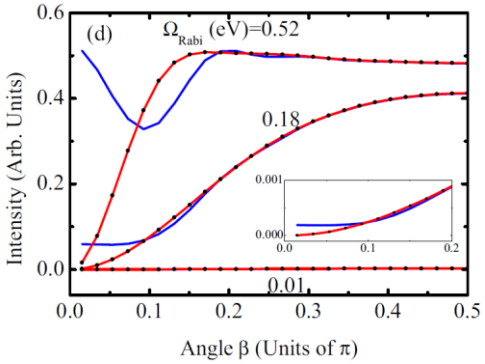

Fig. 1. The angular distribution of photofragments of $^1\Pi$ dissociative state excited from initial state $^1\Sigma$, by including (red-dot lines) and not including (blue lines) electron-rotation coupling by different intense pulses.

References:

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